

MODERN SCIENCE - THAT HOLY COW

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One of the least noticed legacies of colonial rule in India has been the colonizing of the mind. A necessary adjunct to economic and political colonialism it continues to play an important role in contemporary Indian society. Thus, Marx's famous observation about the dual nature of colonialism has found a curious echo in the State ideology of independent India. In fact both political elites and intellectuals – Marxists and non-Marxists – have argued that the economic and political dominations of the colonial power, however condemnable, was enabled precisely because of its superiority in both technological capacity and in the realm of “progressive” ideas – the latter a euphemism for rationality and modern science. As such, colonialism played a positive role in pinpointing the inherent weaknesses of traditional Indian society.

Such a reading of colonialism crucially influenced not merely the processes of State intervention in independent India but the response of dissenting intellectuals as well. Heavy industrialisation was the means by which Nehruvian economics sought to transform a “backward” society. If Marxists pointed to the difficulties in achieving rapid industrialisation within the framework of dependent capitalism, they neither questioned the goal nor its crucial pillar – massive input of modern science and technology (S&T). Across the political spectrum, science, with its myth of value neutrality and promise of plenty, was the one factor of modern life whose emancipatory force was beyond question.

Well, as the tragic saga of Bhopal unfolds, modern science is perhaps, not the holy cow it once was. As with the Prime Minister's wish to catapult us into the twenty-first century, it continues to exercise a powerful hold on the minds of men. Nonetheless, a tiny (but extremely vocal) minority has, over the years, fashioned a critique of S&T that, in the light of events like Bhopal, is bound to attract a larger audience. In this article, we have traced the different perspectives on science and society as they have emerged in the West, followed by a review of the debate in this country. Clearly S&T played a significant role in the Industrial Revolution in contributing to an unprecedented growth in material prosperity whose benefits did reach even the poorer social classes. Not surprisingly, the first systematic efforts to evaluate science as a social institution were celebratory in tone. In the view of the pioneer sociologist of science Robert Merton, the ethos of science was governed by four sets institutional norms- Universalism, i.e. truth claims being subject to pre-established impersonal criteria. Communism (in a non technical sense), i.e. finding of science being a common heritage. Disinterestedness, i.e. absence of fraud, and Organized Scepticism. Now the question was what social order would not conflict with these norms and enable the flowering of science's “peculiar genius”? Merton had an unambiguous answer: capitalism, democracy, with the persecution of Jewish Scientists by Hitler and Lysenkoism in Russia close at hand, he could point triumphantly at these distortions of science under “totalitarianism” of both the right and the left. Following Max Weber, Merton stressed capitalism's debt to the Puritan ethic – an ethic that exalted reason and combined empiricism with rationality.

Marxists came up with a radically different answer to the question of the kind of society in which science would flourish. As expressed in the oeuvre of the Cambridge crystallographer J. D. Bernal, while capitalism led to an unprecedented growth of knowledge, it had also the perversion of science for profit. In the Marxian dialectic growth of productive forces (i.e. S&T) in the earlier phases of capitalism was now fettered by its production relations. In this use/abuse model, science's power could be “used for good or ill”. And if it was freed from the constraints of capitalism, science “will work for the good of humanity far more effectively than it does now for the gains of a few.” For radical scientists like Bernal and J. B. S. Haldane socialism was “construed as the fulfilment of science, as the ultimate rational control of nature by humankind.”

Ironically, despite their sharply opposed political positions, Bernal and Merton show a marked convergence in their reading of science. For both writers “Science” is equated with modern Western science. Bernal for example says that “effectively science in India only, began in the twentieth century”. Moreover, as the embodiment of a

disinterested search for knowledge, the content of sciences is neither contingent on social factors nor can it be the object of critical scrutiny. Celebrating the victory of enlightened rationality over religion, a series of polar opposites is constructed rational vs. irrational, science vs. superstition, and science (value free) vs. ideology (value loaded). As opposed to religion, which is adopted as the embodiment of the collective spirit, science is adopted because it is manifestly true.

This then is the received wisdom which constitutes the dominant view of science. In the West itself, this has been challenged from at least four distinct (though not necessarily discrete) perspectives.

Science and War

First, there is a role of science in war. As chronicled by the Viennese journalist Robert Jungk, the idealist world of atomic physics was rapidly transformed in World War II into an instrument of state power. Hiroshima and its aftermath saw the ethical neutrality of science and scientists come under close scrutiny. The growth of the nuclear establishment and the use of chemical and biological weapons in the World Wars, Vietnam, and now in Afghanistan have brought a hollow ring to Bernal's assertion that the exigencies of war had in fact contributed to nearly all the significant inventions in history. But the irony is that despite the huge amounts spent by the two superpowers on defence research; most of the weapons – nuclear and non-nuclear – are not used in war. In this bizarre scenario, not merely the military-industrial complex but the scientists who work for it have a vested interest in the endless sophistication of the art of war. So what if the present level of weaponry is enough to destroy the world twenty times over - the logic of deterrence demands that American scientists (and by analogy, their Russian counterparts) are continually “pushing the frontiers” of “advanced” S&T. The scientific-industrial complex that was a product of the cold war now in fact generates the cold war. Meanwhile the “inferior” grades of armament technology are sold to the Third World nations who obligingly fall upon each other.

Of course, in recent years the critique of science's role is bringing the world to the brink has proceeded beyond intellectuals and policymakers. The Western peace movement is one of the more significant popular initiatives of our times. It is a sad reflection on the near-total loss of the humanist core of socialism that “revolutionary” Marxists like Jan Myrdal can hold the peace marches to be “objectively” the stooges of the Soviets.

The second kind of criticism has been focussed on the role of industrial technology in maintaining social control. As is often the case, representation in art preceded theoretical formulation. I have in mind Charlie Chaplin's classic *Modern Times*, made in 1936 (note that Chaplin uses the prefix “Modern” and not “capitalist”). Several decades on, Herbert Marcuse, drawing from a strand in Marx that was a victim of “official” Marxism, described capitalism as moribund and its technology as alienating human beings from the essence of life. A little later, Harry Braverman was to write the definitive statement on the use of technology and “scientific” management in maintaining control within the workplace, noting too that following Lenin's enthusiastic approval of “Taylorism” work conditions in Soviet industry were no less alienating.

Thirdly, there was the recognition that S&T operated at the level of ideology in such a manner that even in so-called free societies, the prestige of science was continually used by the state to legitimize action taken without proper attention. As argued by scholars like Jurgen Habermas and Paul Feyerabend, democracy is in essence a technocracy, wherein State-supported experts are called upon to unilaterally offer their solutions. An outstanding example of this is the cloud of secrecy that surrounds the Bhopal gas leak and the subsequent “neutralization” of MIC by CSIR scientists.

Environment

Lastly, there is the ecological critique of modern science in a famous article; the historian Lynn White traced the modern environmental crisis to the Judeo-Christian ethos of man's mastery over nature. By desacralizing nature, Judeo-Christianity had facilitated the growth of modern science. While this led to a quantum jump in the understanding of the “laws” of the natural world, it also sanctioned infinite exploitation under the Baconian dogma that nature exists only to serve man. Moreover, a hallmark of modern science is reductionism – the

investigation of discrete segments in isolation from the whole. Again the revolutions in atomic physics and synthetic chemistry led to the creation of new forms of matter that were not biodegradable and often had an unforeseen and damaging impact on the environment.

The ecological critique of modern science has found expression in the environmental movement. This has many strands, ranging from local level action over environmental issues to alternative health movements and the opposition to nuclear energy. Predominantly middle class in its early phase, it has over the years developed a trenchant critique of industrialism. As exemplified by the Green Party in West Germany, earlier concerns with the “rape” of nature have merged with attempts to create a more just society. In this process of radicalization an important influence has been that of the ecological feminists, who argue that modern science is inherently sexist and a pillar of patriarchal capitalist society.

The emergence of the Green movement is in a sense the crystallization as a political force of the ideas of a long tradition of utopias and anarchist thinkers opposed to the centralization inherent in the industrial ethic. In the words of an early prophet Lewis Mumford:

“Western society has accepted as unquestionable a technological imperative that is quite as arbitrary as the most primitive taboo: not merely the duty to foster invention and constantly to create technological novelties but equally the duty to surrender to these novelties unconditionally, just because they are offered, without respect to their human consequences.”

Recent attempts to combat the “technological imperative” have seen the recovery of writers like Peter Kropotkin, Paul Goodman, and Mumford, and the emergence of the cult figure of E. F. Schumacher and Ivan Illich. Notwithstanding their differences, what these writers have in common is the emphasis on the non-material aspects of life – i.e. an emphasis of *quality* as opposed to *quantity*.

As we had briefly indicated, the dominant perspective on science in India has been conditioned by colonial experience. Convinced that our subjugation was a consequence of technological and economic “backwardness”, the political elites of independent India believed that “it is science alone that can solve the problems of hunger and poverty, of insanitation and illiteracy, of vast resources running to waste, of the rich country inhabited by a starving people.” Implicit in this statement of Nehru was the “equation that investment in science would lead to techno-economic development.” The setting up of the CSIR laboratories working in tandem with planned industrialization was the means by which the infusion of science into economic development was to be accomplished. Science was to be a beacon, and its concerns fused with the concerns of the State.

As is evident, the first three decades of planning have brought no millennium. Our establishment radicals insist (witness the “Statement of Scientific Temper” brought out by our top scientist-bureaucrats in 1981) that this was because we had been unfaithful to the Nehruvian vision and needed to renew the crusade for science. Outside the purview of State agencies, however, intellectuals and activists have started re-examining the earlier assumptions about science’s potential to transform Indian Society. At the risk of some simplification, the major responses can be divided into two groups as detailed below.

The older and more influential trend comes under the rubric of “people’s science movements” (PSMs) – among the better known of which are the Kerala Sastra Sahitya Prarishad, Kishore Bharati in Madhya Pradesh and Lok Vigyan Sangathan in Maharashtra. Many of these groups owe their genesis to the dissatisfaction of socially conscious scientists with the organizational framework of Indian science – highly bureaucratic in nature and whose research priorities are largely determined by intellectual trends in the West. Faced with the virtual impossibility in the institutional setting of doing research relevant to the needs of the poor, these scientists decided to work directly among the people. Science was perceived to be “elitist” in so far as the benefits of science-based development were restricted to a small segment (chiefly urban) of the population. The effort to construct a “people’s” science involves two kinds of strategies. In the short term activists pass on technical advice in areas such as agriculture, animal husbandry and health. In the more long-term perspective science is a potent weapon that could liberate the minds of the oppressed from ritual and fatalism and make them aware of the social roots of their oppression. Thus the role of science in raising mass capability to make a social

revolution is critical. It consists, first and foremost, of generating a scientific attitude and culture of scientific enquiry among the masses, so that they can move from sensory perceptions of their social experience to conceptions and analytical frames and from fatalistic prejudices to a realization of their power to change reality in their favour.

The ideological orientation of the PSM's can be summed up as a more or less direct application of Bernal in an Indian context. Within the use/abuse model, modern S&T is presently used for the benefit of a few, but by educating the masses and freeing them from superstition, a more broad based application of Western science is possible.

“Anti-Democratic”

The other trend is sharply opposed, both in its philosophy, and in its strategy – one of intellectual work as opposed to activism. Here, there is a denial of the autonomy of the content of science from its social and cultural context. As succinctly stated by Ashis Nandy, while modern science had started as a movement of protest it was now a part of the Establishment. While arrogating to itself the right to criticise all other systems of thought (such as religion) science claimed immunity from external criticism. This must not go unchallenged, for modern science was inherently anti-democratic. It was in fact a totalizing philosophy that brooked no dissent and whose often far from noble impact was felt in every sphere of social life. Nor could science continue to deflect criticism to technology. With growing State intervention, there has occurred a fusion of S&T and the focus of research shifted from the university to the industrial research laboratory. Moreover, if science claimed credit for the achievement of technology it must likewise assume responsibility for its misdeeds.

Social and philosophical critiques of modern science in the Indian context have been strongly strengthened by studies of its failure in areas such as agriculture, forestry, and health. The detailed researches of the Patriotic People Oriented Science and Technology (PPST) group have focused, on the one hand, on the viability of many indigenous techniques and on the other on their destruction and suppression under colonial rule. Forestry is an outstanding example. While forest communities did have a highly sophisticated system of conservancy that enabled prudent use, State forestry relies on the methods and prestige of science to justify the reckless exploitation of forests for commercial purposes. More recently, big dams and nuclear energy can be counted as failures on both social and environmental grounds of a developmental strategy based on modern science. The insensitivity to criticism, the fudging of figures and the suppression of vital information by our nuclear bosses epitomizes the coming of age of science as a pillar of the Establishment.

A third trend, which some see as being a variant of the PSM's but perhaps, which is better viewed as straddling the two positions delineated above, seeks to build upon (rather than supplant) traditional technologies with the help of insights derived from modern science. One can mention in this connection the work of A.K.N. Reddy and the ASTRA group at the Indian Institute of Science, and the alternate health movement.

“Science for the people”

The two major trends can be conceptualized as “Science for the people” as opposed to “Science of the people”. If the first trend is politically active and conscious, it works by and large within the received framework of Western science, and does not seriously question its mythology, i.e. of modern science as being objective, liberating, and superior to other forms of knowledge originating outside the sphere of organised scientific activity. The alternate trend is far more critical of the content of science, correctly identifies modern science as operating at the level of ideology as an instrument of cultural oppression, and has forcefully highlighted the suppression of indigenous scientific traditions under colonialism. However, in its historical research it lays insufficient stress on the relations of power and domination in pre-colonial India, and has at times shown certain political naiveté – as in the belief of some of its members that both democracy and socialism are to be treated with reservation since they are “Western” concepts.

It is heartening to note that recent events raise hope of a genuinely fruitful dialogue between the two perspectives. Through their involvement in the Silent Valley controversy, the struggles of fishermen, against industrial pollution, and now Bhopal, PSMs are perhaps less sanguine about the beneficial impact of modern science. One can also mention here the transition in the thinking of two prominent socialist activists – Bharat Patankar and Gail Omvedt. Adhering at one stage to the orthodox position that a people's science would involve "bringing science to the people and challenging blind superstition" their recent writings (both in this journal and elsewhere) show a greater awareness of the social and cultural determinants of scientific practice and of the viability of non –Western tradition. For modern science is by no means immune from the urge to dominate and control that is the hallmark of the forces that propel it.

Both in the West and in India then, popular movements and scholarly studies have highlighted the context laden character of science. The direction of scientific research and the application of scientific techniques cannot be immune from social scrutiny. While the context of science is not "value free", it is not class determined in a mechanical sense either. Rather, the growth of modern science is linked to broader cultural and historical processes. While science did contribute significantly to material prosperity in the West and played an emancipatory role in its opposition to religiously dogma, it now bids fair to being the unchallenged orthodoxy of twentieth century. "Value free" and "objective" is in today's context euphemisms for the amoral and cynical manipulation of knowledge and human beings by scientific experts and their political masters.

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